CLAIMS

What is claimed is:

1. A method for matching a wheel having a tire mounted on a rim, the method including the steps of:

receiving data representing effects caused by geometrical non-uniformities of the rim and the tire, wherein the effects caused geometrical non-uniformities of the rim and the tire vary with positional parameters of the tire and the rim;

receiving data representing effects caused by imbalance of the rim and the tire, wherein the effects caused by imbalance of the rim and the tire vary with positional parameters of the tire and the rim;

defining an index vector representing the effects caused by geometrical non-uniformities of the rim and the tire, and the effects caused by imbalance status of the rim and the tire; and

determining an optimized position of the tire and the rim based on the index vector.

2. The method of claim 1, wherein the effects caused by geometrical non-uniformities of the rim and the tire, and the effects caused by imbalance of the rim and the tire are measured at the same time.

3. The method according of claim 2, wherein the effects caused by geometrical non-uniformities of the rim and the tire are measured by non-contacting means during determination of the effects caused by imbalance of the rim and the tire.

4. The method according to claim 1, wherein the effects caused by geometrical non-uniformities of the rim and the tire, and the effects caused by imbalance of the rim and the tire are measured in succession.

5. The method according to claim 1, wherein each summand of the index vector represents the effects caused by geometrical non-uniformities of the rim, the effects caused by geometrical non-uniformities of the tire, and the effects caused by imbalance of the rim, and the effects caused by imbalance of the tire.

6. The method according to claim 5, wherein each summand of the index vector is associated with a weighting vector.

7. The method according to claim 6, wherein the weighting factor is set based on the type of the wheel.

8. The method according claim 1, further comprising the steps of:

positioning the tire and the rim based on the optimized position;

subsequently determining an imbalance status of the wheel; and

responsive to a result of the determination step, selectively conducting an imbalance compensation process.

9. A machine-readable medium bearing instructions for determining an optimized relative position of a tire and rim of a wheel, the instructions upon execution by a data processing system causing the data processing system to perform the steps of:

receiving data representing effects caused by geometrical non-uniformities of the rim and the tire, wherein the effects caused geometrical non-uniformities of the rim and the tire vary with positional parameters of the tire and the rim;

receiving data representing effects caused by imbalance of the rim and the tire, wherein the effects caused by imbalance of the rim and the tire vary with positional parameters of the tire and the rim;

defining an index vector representing the effects caused by geometrical non-uniformities of the rim and the tire, and the effects caused by imbalance status of the rim and the tire; and

determining an optimized position of the tire and the rim based on the index vector.

10. The medium of claim 9, wherein the effects caused by geometrical non-uniformities of the rim and the tire, and the effects caused by imbalance of the rim and the tire are measured at the same time.

11. The medium according of claim 10, wherein the effects caused by geometrical non-uniformities of the rim and the tire are measured by non-contacting means during determination of the effects caused by imbalance of the rim and the tire.

12. The medium according to claim 9, wherein each summand of the index vector represents the effects caused by geometrical non-uniformities of the rim, the effects caused by geometrical non-uniformities of the tire, and the effects caused by imbalance of the rim, and the effects caused by imbalance of the tire.

13. The medium according to claim 12, wherein each summand of the index vector is associated with a weighting vector.

14. The medium according to claim 13, wherein the weighting factor is set based on the type of the wheel.

15. A system for determining an optimized relative position of a tire and rim of a wheel, the system comprising:

non-contacting sensing means for determining effects caused by geometrical non-uniformities of the rim and the tire, wherein the effects caused geometrical non-uniformities of the rim and the tire vary with positional parameters of the tire and the rim, wherein the effects caused geometrical non-uniformities of the rim and the tire vary with positional parameters of the tire and the rim;

detecting means for detecting effects caused by imbalance of the rim and the tire, wherein the effects caused by imbalance of the rim and the tire vary with positional parameters of the tire and the rim; and

a data processing system coupled to the non-contacting sensing means and the detecting means for receiving data representing effects caused by geometrical non-uniformities of the rim and the tire, and data representing effects caused by imbalance of the rim and the tire;

wherein the data processing system is configured to perform the steps of:

calculating an index vector based on the data representing effects caused by geometrical non-uniformities of the rim and the tire, and data representing effects caused by imbalance of the rim and the tire; and

determining an optimized position of the tire and the rim based on the index vector.

16. The system of claim 15, wherein the non-contacting sensing means and the detecting means determine the effects caused by geometrical non-uniformities of the rim and

the tire, and the effects caused by imbalance of the rim and the tire are measured at the same time.

17. The system according to claim 15, wherein each summand of the index vector represents the effects caused by geometrical non-uniformities of the rim, the effects caused by geometrical non-uniformities of the tire, and the effects caused by imbalance of the rim, and the effects caused by imbalance of the tire.

18. The system according to claim 17, wherein each summand of the index vector is associated with a weighting vector.

19. The system according to claim 18, wherein the weighting factor is set based on the type of the wheel.

20. The system according to claim 17, wherein the data processing system calculates the index vector by accessing the respective weighting vector stored in non-volatile memory of the data processing system.

21. A method of matching a vehicle wheel having a pneumatic tire mounted on a rim, in which the tire and the rim are rotatable relative to each other, the method characterised in that geometrical deviation data representing deviations from geometrical reference data of the tire and the rim are measured, and an imbalance measuring operation is carried out, wherein during the operation of measuring the geometrical deviation data and the imbalance measuring operation, the tire is in a first position on the rim, and that the tire is then rotated on the rim to a second position such that an index vector resulting from the geometrical deviation data of the tire and the rim, and the imbalance caused by the tire and the rim, is minimized.